

Comment on “Co-Benefits to Children’s Health of the U.S. Regional Greenhouse Gas Initiative”

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The recent publication by Perera et al. (2020) applies the U.S. Environmental Protection Agency’s (EPA) Environmental Benefits Mapping and Analysis Program–Community Edition (BenMAP-CE) (Sacks et al. 2018) to quantify the public health impact of changes in fine particulate matter [particulate matter with an aerodynamic diameter $\leq 2.5 \mu\text{m}$ ($\text{PM}_{2.5}$)] due to the U.S. Regional Greenhouse Gas Initiative on children’s health. Although the methods used within the paper are scientifically sound, we are concerned by the choice of health outcomes quantified within these analyses. Specifically, the choice of these health outcomes for quantitative analysis may signal to the public more confidence in the relationship between exposure to air pollution and preterm birth, term low birth weight, and autism spectrum disorder than is supported by the available scientific evidence. As the authors of studies and scientific assessments of particulate matter, and as experienced trainers and users of BenMAP-CE, we urge caution in conducting and publishing quantitative analyses with health outcomes that are not well supported by the current scientific evidence.

Perera et al. (2020) note that the outcomes examined are “causally or likely to be causally related to $\text{PM}_{2.5}$ exposure.” However, the results of the available birth outcome studies are limited by the lack of control for potential confounding by copollutants, limited understanding of the biological plausibility of how exposures could lead to these outcomes, and uncertainty regarding critical exposure windows (U.S. EPA 2019). These limitations led the U.S. EPA to conclude in the “Integrated Science Assessment for Particulate Matter” (PM ISA) that the evidence for birth outcomes is “suggestive of, but not sufficient to infer, a causal relationship” (U.S. EPA 2019). Further, although the causality determination for long-term $\text{PM}_{2.5}$ exposure and nervous system effects in the PM ISA is “likely to be a causal relationship,” the strongest evidence for this conclusion comes from studies demonstrating effects in

older adults, with relatively limited evidence from epidemiologic studies examining the association between $\text{PM}_{2.5}$ exposure and autism spectrum disorder.

Analyses that quantify the potential implications of environmental policies on public health should be rooted in those health outcomes for which the weight of evidence is strongest and for which uncertainties have been reduced sufficiently. This will help ensure that the appropriate information is conveyed, by public health experts, to the scientific community and the public. Perera et al. (2020) are correct that the focus should be on health outcomes where the evidence supports a “causal or likely to be causal relationship,” as is the practice of the U.S. EPA in the process of conducting regulatory impact analyses for the National Ambient Air Quality Standards. The focus on evidence where the conclusion is less than likely to be causal may convey a level of confidence in the data that is not supported by the available evidence. For further details regarding the characterization of PM evidence for birth outcomes and nervous system effects, see the recently published PM ISA (U.S. EPA 2019).

References

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